

REMARKS

Claims 1, 6, 7, 9, 11, 13, 14, 16, 17, 20, 22 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasanuma et al. JP 11243251 (hereinafter "Sasanuma") in view of Sverdlov, U.S. Patent No. 6,455,337. Applicants respectfully traverse the rejection.

Claim 1 recites:

1. A light emitting device comprising:
 - a substrate;
 - a first conductivity type layer overlying the substrate;
 - a lower confinement layer overlying the first conductivity type layer, the lower confinement layer comprising $\text{In}_x\text{Ga}_{1-x}\text{N}$, wherein $0 \leq x \leq 0.15$;
 - a spacer layer overlying the lower confinement layer;
 - an active region overlying the spacer layer, the active region comprising:
 - a quantum well layer; and
 - a barrier layer comprising indium;
 - a cap layer overlying the active region;
 - an upper confinement layer overlying and adjacent to the cap layer, the upper confinement layer comprising $\text{In}_x\text{Ga}_{1-x}\text{N}$, wherein $0 \leq x \leq 0.15$; and
 - a second conductivity type layer overlying the upper confinement layer;wherein:
 - the spacer layer and the cap layer have larger band gaps than the quantum well layer;
 - the upper confinement layer and the lower confinement layer have larger band gaps than the spacer layer and the cap layer; and
 - one of the spacer layer and the cap layer comprises indium.

Claim 1 recites a device with three layers on a first side of the active region: a first conductivity type layer, a lower confinement layer, and a spacer layer. The lower confinement layer overlies the first conductivity type layer and the spacer layer overlies the lower confinement layer. The Examiner does not specify which layer of Sasanuma's Figs. 5 and 6 corresponds to each of the above layers. Assuming that n-GaN layer 3 is the layer of first conductivity type, since GaN layer 2 does not have a conductivity type, n-InGaN layer 14 would correspond to the lower confinement layer. If AlGaIn layer 15 is claim 1's barrier layer, Sasanuma's device lacks a spacer layer overlying the lower confinement layer. If AlGaIn layer 15 is claim 1's spacer layer, Sasanuma's device lacks a "lower confinement layer [with a] . . . larger band gap[] than the spacer layer" as recited in claim 1.

Sverdlov is cited as teaching that GaN can be used instead of AlGa_N and adds nothing to the above-described deficiencies of Sasanuma. Claim 1 is therefore patentable over the combination of Sasanuma and Sverdlov, because even in combination, Sasanuma and Sverdlov do not teach all the elements of claim 1.

Claims 6, 7, 9, 11, 13, 14, 16, 17, 20, 22 and 23 depend from claim 1 and are therefore allowable for at least the same reason.

Claims 2, 3, 5, 10, 15, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasanuma in view of Sverdlov and Bour et al., U.S. Patent 6,285,696 (hereinafter "Bour"). Applicants respectfully traverse the rejection. Claim 2 is amended to depend from claim 1; accordingly, claims 2, 3, 5, 10, 15, and 28 depend from claim 1. Bour is cited as teaching that GaN layers may be replaced with InGa_N and therefore adds nothing to the deficiencies of Sasanuma and Sverdlov with respect to claim 1. Claims 2, 3, 5, 10, 15, and 28 are therefore allowable for at least the same reasons as claim 1.

Claims 4 is rejected under 35 U.S.C. 102(b) as being anticipated by Sasanuma in view of Sverdlov and Bour and further in view of Koide et al., U.S. Patent 6,326,236 (hereinafter "Koide"). Applicants respectfully submit that rejection under 102(b) is not proper, and treat the rejection as a 103(a) rejection. Claim 4 depends from claim 1. Koide is cited as teaching a doping level and adds nothing to the deficiencies of Sasanuma and Sverdlov with respect to claim 1. Claim 1 is therefore allowable over the combination of Sasanuma, Sverdlov, Bour, and Koide.

Claims 8, 12, and 21 are rejected under 102(b) as being anticipated by Sasanuma in view of Sverdlov and further in view of Koide. Applicants respectfully submit that a 102(b) rejection is not proper, and treat the rejection as a 103(a) rejection. Claims 8, 12, and 21 depend from claim 1. Koide adds nothing to the deficiencies of Sasanuma and Sverdlov with

respect to claim 1. Accordingly, Applicants respectfully submit that claims 8, 12, and 21 are patentable over the combination of Sasanuma, Sverdlov, and Koide.

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasanuma in view of Sverdlov and further in view of Duggan, U.S. Patent 6,072,189. Claim 19 depends from claim 1. Duggan is cited as teaching graded layers and adds nothing to the deficiencies of Sasanuma and Sverdlov with respect to claim 1. Accordingly, Applicants respectfully submit that claim 19 is patentable over the combination of Sasanuma, Sverdlov, and Duggan.


Claims 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasanuma in view of Sverdlov and further in view of Schetzina, U.S. Patent 6,046,464. Claims 24-27 depend from claim 1. Schetzina is cited as teaching grading and adds nothing to the deficiencies of Sasanuma and Sverdlov with respect to claim 1. Claims 24-27 are therefore allowable for at least the same reason as claim 1.

In view of the above arguments, Applicants respectfully request allowance of Claims 1-17 and 19-28. Should the Examiner have any questions, the Examiner is invited to call the undersigned at (408) 382-0480.

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Respectfully submitted,



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